Attorney: Walter G. Maxwell
Docket No.: 51306/WGlM/W277
Inventor(s): N. Bruce Moore et al.
Title: THREE-DIMENSIONAL STEERING TOOL
FOR CONTROLLED DOWNHOLE EXTENDEDREACH DIRECTIONAL DRILLING
Sheet 1 of 15

- FLEX SECTION ROTARY SECTION MUD PULSE TELEMETRY SECTION

F1G.1

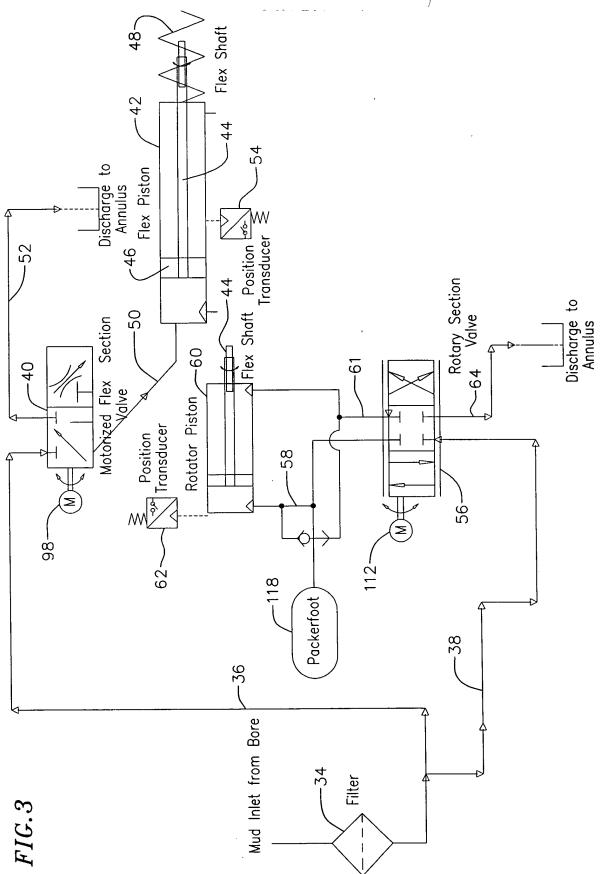


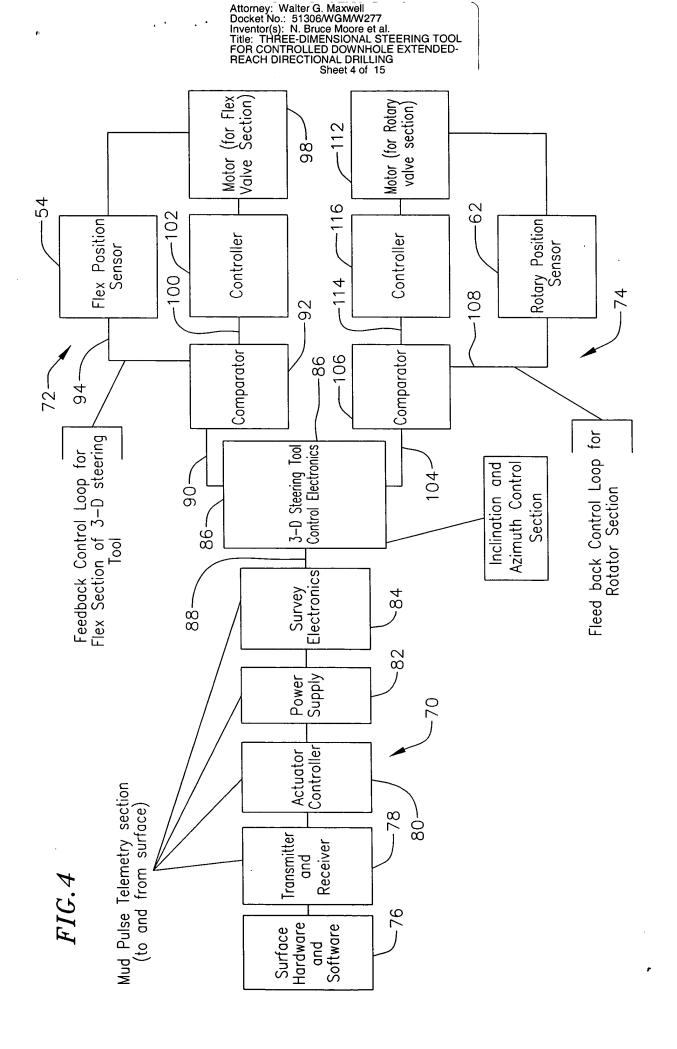
Attorney: Walter G. Maxwell
Docket No.: 51306/WGM/W277
Inventor(s): N. Bruce Moore et al.
Title: THREE-DIMENSIONAL STEERING TOOL
FOR CONTROLLED DOWNHOLE EXTENDEDREACH DIRECTIONAL DRILLING
Sheet 2 of 15

FLEX SECTION ROTARY SECTION , MUD PULSE TELEMETRY SECTION

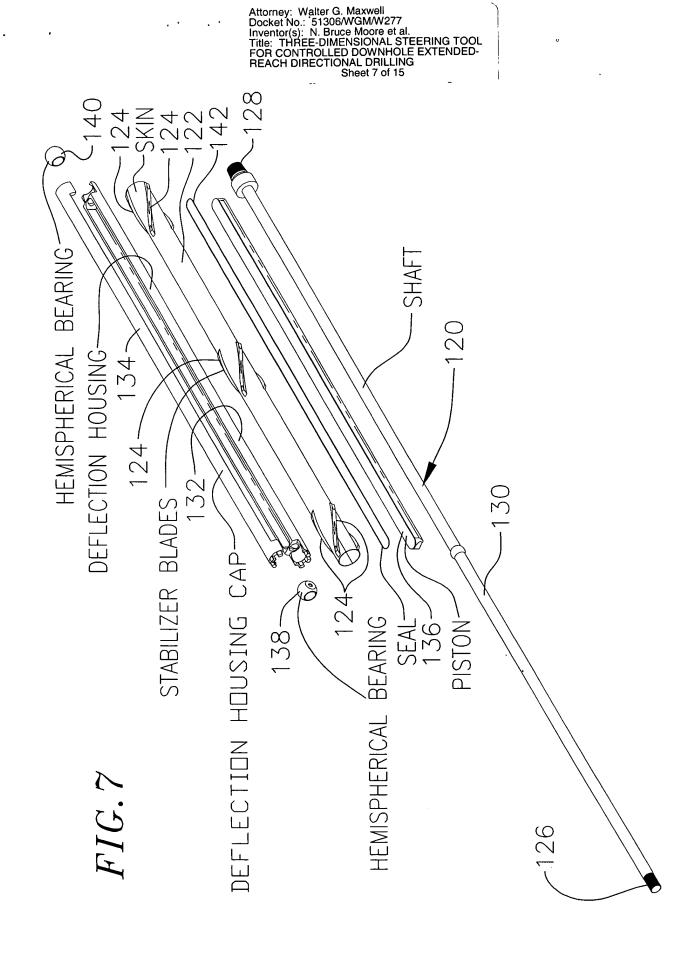
F1G.2

Attorney: Walter G. Maxwell
Docket No.: 51306/WGMW277
Inventor(s): N. Bruce Moore et al.
Title: THREE-DIMENSIONAL STEERING TOOL
FOR CONTROLLED DOWNHOLE EXTENDEDREACH DIRECTIONAL DRILLING
Sheet 3 of 15 Flex Shaft 54



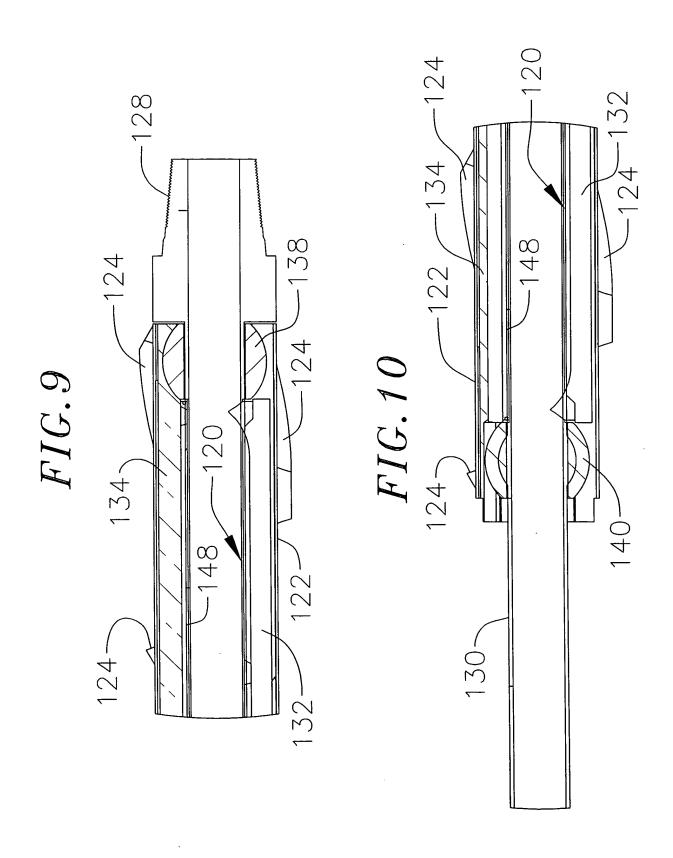


Attorney: Walter G. Maxwell
Docket No.: 51306/WGM/W277
Inventor(s): N. Bruce Moore et al.
Title: THREE-DIMENSIONAL STEERING TOOL
FOR CONTROLLED DOWNHOLE EXTENDEDREACH DIRECTIONAL DRILLING
Sheet 5 of 15 SKIN STABILIZER BLADES-FIG.5



Attorney: Walter G. Maxwell
Docket No.: 51306/WGM/W277
Inventor(s): N. Bruce Moore et al.
Title: THREE-DIMENSIONAL STEERING TOOL
FOR CONTROLLED DOWNHOLE EXTENDEDREACH DIRECTIONAL DRILLING
Sheet 8 of 15 DEFLECTION HOUSING DEFLECTION PISTON LOW FRICTION BEARING DEFLECTION —— HOUSING CAP 164 -148 FIG.8149 LOW FRICTION BEARING MUD PASSAGE LINE FLEX SHAFT-SEAL 142-SKIN

Attorney: Walter G. Maxwell
Docket No.: 51306/WGM/W277
Inventor(s): N. Bruce Moore et al.
Title: THREE-DIMENSIONAL STEERING TOOL
FOR CONTROLLED DOWNHOLE EXTENDEDREACH DIRECTIONAL DRILLING
Sheet 9 of 15



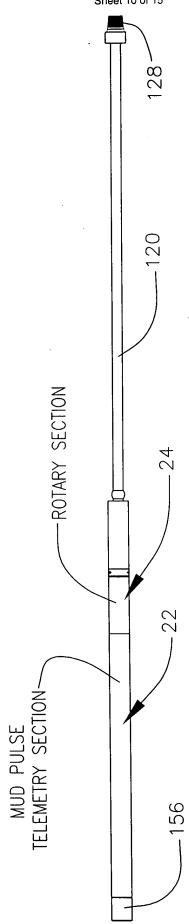


FIG. 11

Attorney: Walter G. Maxwell
Docket No.: 51306/WGM/W277
Inventor(s): N. Bruce Moore et al.
Title: THREE-DIMENSIONAL STEERING TOOL
FOR CONTROLLED DOWNHOLE EXTENDEDREACH DIRECTIONAL DRILLING
Sheet 11 of 15 28. FLEX SHAFT -152 BEARING PACK 120 --120 -DRIVE SHAFT 160 FIG. 13 FIG. 12 58 24\ 156 154 TOOL JOINT COUPLING 52.

Attorney: Walter G. Maxwell
Docket No.: 51306/WGM/W277
Inventor(s): N. Bruce Moore et al.
Title: THREE-DIMENSIONAL STEERING TOOL
FOR CONTROLLED DOWNHOLE EXTENDEDREACH DIRECTIONAL DRILLING
Sheet 12 of 15 154 ROTARY SECTION VALVE 186 > VALVE HOUSING SEAL -40 184 56-MOTOR CARTRIDGE ASSEMLBY 173 175~ 98 166 -166 ROTARY SECTION - VALVE MOTOR -162 -164 120 152~ ELECTRICAL WIRES-MUD PULSE TELEMETRY HOUSING POWER SUPPLY-DRIVE SHAFT

DRIVE SHAFT

FIG. 14

FLEX SECTION VALVE MOTOR

ELECTRICAL WIRES

3D STEERING TOOL — CONTROL ELECTRONICS

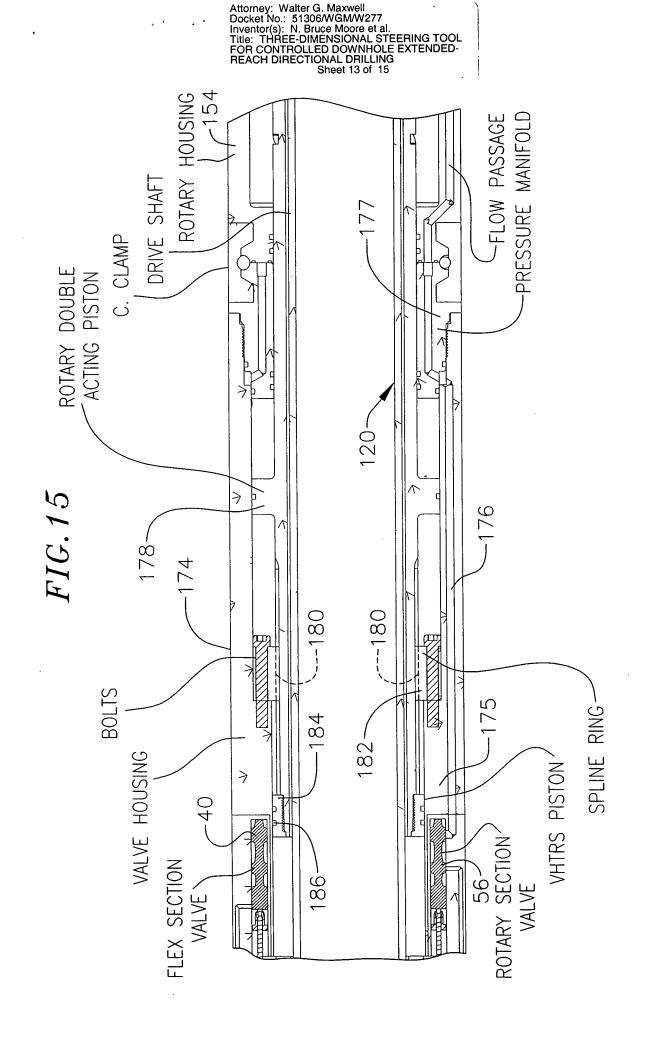


FIG. 16

